

10/593426

SEQUENCE LISTING

<110> PAPES, Fabio
GERHARDT, Isabel Rodrigues
ARRUDA, Paulo

<120> CAMBIUM/XYLEM-PREFERRED PROMOTERS AND USES THEREOF

<130> ALEL 202.1 PCT

<140>

<141>

<150> US 60/560,227

<151> 2004-04-06

<160> 41

<170> PatentIn version 3.2

<210> 1

<211> 3035

<212> DNA

<213> Populus sp.

<220>

<221> promoter

<223> Sucrose synthase (SUSY) promoter

<400> 1

tcatgtccta tccaacggcg atgcaaaactt cgctgtcccc cacttttttca taggacgagg tgaagttag 70
ctatatatct ttttttttta atttaaattg ttaattcttt atatttttat attcttttaa ttttatattt 140
ttatattatt ttgatattatt acatcaagaa taaattttta aaaaataatt tttaaaattt acttaaccac 210
gcaatacata aaaaataata gaaccaccca acctaaagaat acttgtcaat gcatagaagt acacctgcta 280
gttcttaaaa ccaacaaaag gaagcaaagt agatctctga gtcaaaaacc agaggaaacc atagaaacac 350
ataataataa taataataat aataataata aaattaattt aacttggtgt aataataaaa ttaatttaat 420
tacaagagtg gtaactcaac tagtcatgtt cttaaatttat tctctagaga ttactagttt gagttttaca 490
aattttaagg ccactgaaga tttatatagt cattaatctt agaatatata agattagttg agttacgtat 560
aaattgatta aaaaatcata ttaataaaaa taaaaaattt aatttaaagg ttttaagaaat caaattaaga 630
gaaaagagtg gtgttttatt tttcatcgtg ccctctctca acagacaagt agaagatga gagagagagg 700
gtaagaaat ggatttatga gaacattgac cacagggaaa gagagaagcg gttttgtgaa aggaacaatg 770
aaaccacagg aaggtaaagc ggtaatgata tatctcacga atactaaaac tagaacaaca agttttttta 840
tcaaattaaa ccacgagtg c aaggccgtct tctctgtgta taaaagggtc cttcttcttt ctcatctccc 910
attctcatct gcaaacttct cctttgcaat ctttctttct tgcgttctgt gtgttcgttg tgatttgtgt 980
tcattcttct tgtctattag cttgtccccc cgtccgactg ctttctgtat ttattctggc attaagctta 1050
aggtaaagat ccctcaacta tccaagcaa tttattctgt ttttatgtga tcttgaggga tcttctcttt 1120
ggatgcgctt tttatttttt cttcctcctt cttcctgctc cttcttacct tgtatctgat ccccagacg 1190
aaaatgtttt ttgttttttt aattagctca acaaatcaaa aacattcaca taataacaca gctcgaaaga 1260
aatctgatac agttttaatc tgttgtattt taaaaatcat tacagttcat gcatgctgat actttaccat 1330
gtcatgaaat taaatccag catccttttc catagccaaa gaaggatcag cagcatgctg atagtttacc 1400
atgtcatgaa attaaatccc agcatccttt tccatagcca aagaagatc agcagcatgc ttgcttatac 1470
aaggctctcg cttgcttacc aaggccactg aaacatcatc atcgtcataa ctatgataga accgcctac 1540
tgccggcatt gaaaacatca tcaactagtgt ctctacatta aaaaacaccc actgtctaatt ttcctatttt 1610
tttactctta aatgtcttt cggttgagc tcctcgggct ccacggatgg caactgctgt attatatata 1680
tatatatata tatatatata tatatatata tatatatata tatatttccc tgttggtac 1750
atagacctgt taataccgta taaatagata atattaatat atagaattca tgtatctttc cgagattaag 1820
cgatgccgta taaataatat taatatcttt gaatcagtat gtatattaat taaaattaat ttttttcaaa 1890
gtaattttta gagcgcatct tcaacatcca ttttagtttt ttttaataat aaatctctct ttgcattaat 1960
cctaacgttt gaacttagta aattaaaaaa aggaaaaaac ctttttcacc aatatagaat caatgaacag 2030

cactagtttg	cttgaaataa	aaataaaaat	aaaatcta	aatgacatttc	gaaatcatcc	ttatccgcaa	2100
atcactacat	tagtatagta	tcttgaaaga	taagcaagga	tcattgcaagt	ttataataat	taaacttaaa	2170
acgtactatg	acgtgtgcat	cattcattca	ttctgcatga	aactctccac	aagtctagcc	tttgcacat	2240
tcattctact	tcattttatt	ttttcctcta	atgggttcga	ttgatttttc	tttcttagag	tctgggtctt	2310
tagttcaact	ttacatgttt	taggctcgta	ttttgagaga	aaaaaaagaa	aaaagtatgc	agatcatgat	2380
tctgcaaaat	actgaactag	tggtctgatg	aattaacatg	tagcatgtat	aatgctggaa	gaactaaaga	2450
gcagttgggc	tgccatgacc	aaaagaaact	tcgactgatt	ataaatgtca	aaacttgggc	ccattctttg	2520
gtttctgtct	gttggtttat	gcatgggcaa	aactctgctt	atttttcaac	gtccaacgtc	aaatgggaga	2590
ggtttaaat	ctattgttat	gtctaaacca	cgtggtgtgt	atctatatct	gaccgaacat	tcaagctttt	2660
ggatttcac	aagaagggtt	ttctctcttc	tttcttttca	taattgtaat	gtgtttaatt	tggttcttgc	2730
ccaataatct	tctctgcttc	aaactaactt	taattgttcg	atctcttgcg	ttattttaga	catgtgcaat	2800
cacctttcac	tggtgaaaaa	atgggttggtg	agggtgaggtg	gtagggtttg	aagtcttcta	gaataatgtg	2870
gtttctctgt	tgctcttgac	ttcttcttgt	agatcatttc	tggtctggcta	agctatccat	acccccccgc	2940
ccctacaaat	aatattgagt	tggtgctggg	cttaattcct	attatctgtt	attactccca	ctgattgctt	3010
tctgtttctc	ttaaggagct	atggc					3035

<210> 2
 <211> 2513
 <212> DNA
 <213> Populus sp.
 <220>
 <221> promoter
 <223> alpha-tubulin (TUB) promoter
 <400> 2

ccctggaggt	tggtgtagt	gaaataagag	gggttaaatat	tttttttga	ttaaaccatt	caaagtgaat	70
tttttaataa	aatctcatag	gctgattaaa	tgaaattcct	ttagagtcac	catacggtaa	atttgatgtt	140
agtttggtgt	tatagtgcac	attacttttt	aattaaaaga	tagcaatgct	tccagcatgg	tggactcggt	210
tttcaaatcg	aaagctgctt	cttcttcttt	gttttttttt	tttaattctg	tttttcta	ttcataaaaa	280
ccaatcatta	tttcgcaggt	caggtagtta	aatttgtagt	gctaattgat	ccagaaacct	ccggaaagtc	350
aaactcaaat	aaactgctga	cctttttatt	tattttttatt	ttttgaattc	taattcgtcg	gactatctgg	420
tcaagataat	ccacctctca	tgcaataact	tcttagagtg	ccatccatta	tacctgttta	agttgccggt	490
gattgcacat	gtttgaccac	cctccctccc	ctaattttca	cggcggaag	gggcttgttt	gggcttgttt	560
taaattataa	taatagtgtg	gattttaaagt	attttttatt	taaaaatata	ttaaaataat	tttttttatt	630
ttttaaaaat	tatttttaac	atcaaaaaca	catgaaaaca	taaaaaaatt	gttttcattc	tttttaaaaa	700
tatttttttt	ctatttttat	tcaatattat	tatatagttt	tcttattttt	atttttctat	taagtattat	770
taggtttttc	tggttttttt	tttaatttaa	aggaaataat	tttttttcta	ttcaatatta	ttagaaattt	840
ctaatttttt	ctatataaag	gatttttaaaa	ttgtaataac	attttgacaa	gaaatttaat	gaataaaaaat	910
taaatattct	agatatctct	tcacagttat	gacattcttg	gttttaattt	ataataaatc	gcattatcat	980
taaccctcgg	ctaaattatc	tattttattt	tgaccatgga	aacacaagtg	cgtgtgtatt	tggggaggtg	1050
tgggttttaa	gcctgcaata	taattgaaga	aaaaatttaa	gaatttttcc	gcgttgatga	aaccctgatt	1120
gaagggttga	gcatgcctca	ataggcagac	gggcgaaact	tagaaaccag	gaataaacgt	gaaacacggg	1190
attcacacga	atttggaat	ccacgcttgt	aaagaaaacc	aaaccgcata	attttatttc	ctatttggtt	1260
tcgcgtcttg	tttttaaaaa	attttaaattt	tattttattt	ttttttcttt	aaattaatat	ttttttgata	1330
atttttagatc	attttaatat	gctgatataca	aaaataaatt	ttaaaaata	aaaaaaatat	attatttttaa	1400
tatatctcta	aataaaaaac	acttcaaaaa	acaattataa	ccatattttc	aaacaagtac	tattaaaaaa	1470
gtgatggaca	agagaaatca	aggggtcgcg	gatgcgcttc	agcaatagtg	aatgacaact	agtctaaagt	1540
taaaaacttag	acctcctcgc	gtaaatttta	tatttatatt	tttaattatta	atacattaaa	ataattaaaa	1610
aataatttta	aaatcattaa	ttcatacaaa	attttttaag	catatttaaa	agagaataaa	cggcaaaaaac	1680
aaacctacgc	taattgtgaa	ataaaaagatt	aatctatgca	cacggtatcg	ttttacttca	ctggctcggtg	1750
taataatttc	tctaacctta	tgaccaaca	attcactatt	ttgaaacct	tgttattatt	ttttttatca	1820
accattttct	taatctccat	ttcactcatt	ccagttgcct	ggacagtgga	catgggtggc	gtgcctcttg	1890
atcttttcta	gttgggccac	atgaatacac	ttcaagggat	ttgaaactag	gcctaatacga	ttgaaacgta	1960

gaatccactc	tctaattgag	aggacggccc	accctcctgg	gcgacgtgcc	ctctcatcca	ccaggaccac	2030
cgccatcatg	ccttctctgc	tccttcctca	cgctcccaa	cagaatgaca	ttattagcct	ccatcccaac	2100
tatagaccgg	cagtggcaca	actgcaattt	cctacaaccc	aagacgatcc	ccaaaactaa	attcaaaaat	2170
caaaaatggag	cgggcaacta	accatgggta	aaataacgat	tcggccaacc	tggcaaaatc	aagaattagg	2240
tggcttggga	aacggcatca	ttggcatgca	cctaatttga	cccgtgggta	aactaacctt	ggttagctaa	2310
accacacact	ccctccgtcc	cctaatttct	ctccctctga	aagtatataa	accccatact	cacagacctt	2380
aaagctcacc	cctgaaattt	cataggcgtc	ttgataaacg	ccaccctccc	tcagcatcaa	ttccaattgt	2450
ctttgctttc	gattttctct	tcttttaata	tctgttgatc	tttgtgcttt	gagagaaaat	gag	2513

<200>

<210> 3

<211> 2041

<212> DNA

<213> Populus sp.

<220>

<221> promoter

<223> Arabinogalactan protein (ARAB) promoter

<400> 3

caaaggatca	tggagttgga	atccccacca	tccctatttt	atttgataaa	aattaagcac	cagggtggta	70
gggatctatg	caagttccaa	gttcaaagga	cttttctactg	gaagtgatat	gtcagagaat	aatatataaa	140
ttatttcttg	gaatctcacc	aatccctatt	tatttgataa	aaattaagta	caaggtagtg	cgaaacctgt	210
acaagtttta	agcctaaagg	gcttttcaact	gaagagggtg	gttagagaat	aatataaatc	atatcttaga	280
accttaccta	acatcttaag	ctattgagat	gagatgattc	tttgacatgg	tatcagaact	ttaatgacca	350
aacagtcatg	agtttgaatc	tcaccatccc	tattttattg	ataaaaatta	agcacaagat	agtgtgggca	420
tgtgcaagtt	tcaagcttaa	tgacttttta	cttgaggggg	gtgtgttaga	gaatgatata	aatcatatct	490
tggaaatcta	cctaataact	taagttattg	gattgagatg	attatttgac	gatcagagaa	gacaaagcat	560
gcattaagga	gggtagagag	aaaggaaaag	gagggtgcag	gacaatgggt	aaagcaaata	tttcattaca	630
agtttttgaa	gtggttgga	tcaaaatggt	gttctcttta	atctgtaaga	ttatatatgg	ttctgctgac	700
aacatttgaa	tgcgaggctg	aacataatgc	aaaagagtag	aaaatgctaa	ttatcaagaa	atcaggcttc	770
tgaacagaa	ctacctttac	taggttatct	cttgaaactc	tactaaactt	aatgtgaaca	aatctgctgt	840
attgctctca	cacaggaacc	ttttaagttt	cctcagaatg	aatttttctc	tagtttaagc	aatcccacat	910
caggttaagt	tcttttctcc	tgtttcaaaa	ctgctgggtg	tgataattag	agaaaagaga	gtggttagaga	980
gcataggatt	gttactttta	gcttgaggaa	gtggattcca	atcagtaaaa	ttgtcgaggt	tatatcacia	1050
ttttcataaa	ctgaatgtga	cagacgactg	ccagaaaaac	ccttctatga	tttgctgcat	tatggaggaa	1120
aatcatggtt	ttggtggaag	catgatccat	tcaccttagt	acgtttaaca	tgaataaaag	gcttgagctc	1190
tagtacagaa	tcccttgccct	caactccctt	catccttccct	cctccgcggt	catctacaaa	accctcctcc	1260
accgcctttt	ctttcatcct	ctccatgaat	aaaagactat	tatgccattc	aacatcatgt	aaaagaacac	1330
aattcctttt	acttcgaaat	ggctatctta	aagtttcaag	acttgcggtt	gcatactgca	aaatcacttt	1400
tatcaatagc	atgacctcta	cgggctcatg	tacataaggt	aagtgtttct	tcatgaagtt	gtggttaagt	1470
atggtctggt	gtgagatttg	atttctgagc	gtgcgaatct	agaaaattag	tgatctatca	atgtctgtca	1540
aggattaagg	atgtaaatat	tcgttctttt	aagctaaaag	agcaaagact	tggctattta	cgatacaaa	1610
gtcagtttag	atcgcttgct	taaatcttct	gtcattatag	atgatttggt	ttgatgttaa	gaagcatgct	1680
cagctgttct	gctagtgatg	attcacaatc	atggacatct	ttatttggtg	tcacagccac	ttgaaatcta	1750
ccttttagaa	cctttttttt	ttgcctgctt	ttccaaggaa	agtagttgct	gcagcattgt	taaatttccc	1820
tctccattga	tgacctaca	gcttttgagg	tgagataagg	tactagcaat	ctagttgtat	aactaaaatt	1890
gtatattgca	cctaacttga	tcctctgtcc	actactataa	aaacctcact	ctatctcatc	tttacacatc	1960
aaacacttta	tgattgaaat	caatttgcat	tagtatattt	gaattgtttc	gagcatttta	tcccaaaaaa	2030
ataaggatga	a						2041

<210> 4

<211> 2422

<212> DNA

<213> Populus sp.

<220>

<221> promoter

<223> Caffeic acid 3-O-methyltransferase (COMT) promoter

<400> 4

```
cataatatca aaacttaagc agatcaaatt gaaatatatt tgtaattttt atataaatta gcactgatat 70
gtcaaaataa agacttcaaa ttcaaaactt aagtagacca aactgaaata tatttgtaat tcctatagaa 140
atcaacattg gtataccaaa ataaagagtt tagatttctg atctagcctg cagcagcaga gtaaaacaaa 210
aataaagtct gaataggaat cacgaaataa aatgaaatga agaattgcaa aatcataatt aaatgaagtc 280
tgaagtttca aaatcctgac caggtataaa attaagatgc aaaaaacaaa atcttatcag aactaaagtt 350
agataatcga aagtaaagta gaatctagat ttaattaatg tattggaggg gaacaattgt tcatattcga 420
tcaaggaaat taacacctaa ttaataaaaa aggctcgaag atgagaagga cggtgcatgg atggtcaaaa 490
aacgaagcag cagaagagaa tggtcggtgg tgcacagtca tgttaaatgt ccaaattaaa aacaaaaaaa 560
aggtttaatt atgaaaatat ttcatcttta acgaatatat caaactgcc aacccccac cggttcatt 630
tatatgggag gagtgttgga tttttttatt aaactcaatt ttttataat ttaattttaa atctgattga 700
tgtcttataa taaattttta aaaaatatat agataaaggt tgatctagtc aattcaagag tcaataatga 770
ttttatcaaa atttaattta atttttttta aaacaaaaca taattccaaa acaatgttgt ttggattttt 840
tttttaaaaa aaaacataat ccacccatgt cattaattta ccaaactcct aacacaatca tgtttaataa 910
cccttcaatt ttcaaaaata atttcagttc ttatatattt tttttttgc aaattagtcc ttgtttgaat 980
tttcttttta gttcttatac tttaaaaaa ttatagttta tttttttatt gtgattcttt ttattataat 1050
taaggtccct acatgctttt ttttttatgt aatgcttttt aatgtaataa atcattctga ttgtaatcat 1120
caattatata attattttga caattacata attaaatata gaaatataat aaattattac gttacatgat 1190
ctattactaa gtacccaagt ctctacgtca atgttcaatt ttcagcaggt ggttctgtta gaatgtccca 1260
tccaaatat ggattcattg atacgatttt taagtccaaa caacctcat attagcaaa accctcatat 1330
taagcaaaag attattatta ttattattat tattattatt tattattatt attattgttt ttgtgttgt 1400
gcttcttctt tttctcaatc aacaaaattt ttaccaactt caagattttt ttttttatgg ttaaaggta 1470
actaatatga cctaataact tagaagtgtg gattatagat aaaattagca attcgtgcta tatagtgggt 1540
tggatattta tttatataaa aaaattatat atataagttt ttttttatgc atacttgtac aaaaaaaaa 1610
tataaataca aatcaaatat ttattcaatc aaatgataat agaaccagat atatatgaaa ttgattaaaa 1680
aaaatatatc atgttaggtc aacatattag aaatactata caaaaataaa tttttatatg tatataacac 1750
atacaaatga tttctatagc gtgtgtttat tcagtgtggt tcatttatat taactttaaa atcattagtt 1820
ttataggatg taaattttat ttttattaat tttaaatgtg ttcaataaat acaatcgggt gaatgtatca 1890
ttatgtgatt gaatatctta atctgcattt atctcttaat tttttcagtt ttttttttgt tattgttaat 1960
gaattttttt ttattttat ataatgattat tgattttatt aattagatgc tttatacttt aattttttat 2030
atataaaaaa acatattaaa acaatctata tacctgatat tttattttt aaaaattata acccatgata 2100
aagaagtttt ataaacctac ctgcttgaca tattacatca tgttccaata gtctcccctg aaacaggtta 2170
aaaaaaaaa agtttggaac ataagacgag gaaaaatata tagaaaaaaa ggtagggagt cagttctagg 2240
aagaagacat ttgtgcatca agtagagagg agggaccaac cacaaggtgg ttgagcactt caccatatat 2310
agcaccactt tgcaacctct ttttcagtat tctcatatcc tcttcacttc ttttcttttc accttcttca 2380
accttttggt tccttaaaga attcaatctt gatcaagatg gg 2422
```

<210> 5

<211> 793

<212> DNA

<213> Populus sp.

<220>

<221> promoter

<223> cinnamyl alcohol dehydrogenase (CAD) promoter

<400> 5

```
ttgaattgat gacgtaggaa acatgataaa catgtaatct aaatatatct catgtctagg tcatgggttt 70
cacgtattag tccagcttta tccaaaataa tttttttatt tgttattatt gttaccttat tttttcatca 140
tattattaaa ttaattaaaa tttaatcaaa acattaattt tttcttactt ttttttaaaa tataatcttc 210
tcttaattt cttttttcat gttaaaaaa atttcagtcg acggcacaac aatccagtaa ataccaaggg 280
```

tatattgtcg cactcacca ccaactacgt caattaagca aataatataa ttaggcaact gtgtaaccac 350
catggaaatt aagatattcc ttcatgaaa tacttaatta gtgacgtata catgatgtc caaacctcat 420
cacagattca gtgttcttaa ctattatgtt cccttttgtt tccaagaac catgagttaa tcaggaccat 490
cgatactact gaggccccc caatgttttg atcatgtgga caatgttcac ttgattttca actttgaaga 560
aatgacccat ggttgtggaa gcagaggatg gcgccactcc atcacatttc acctaccacc acccgtaaaa 630
tatgcgagc tgccttgtc ttttttgtt ccaagtaacc ttgccattc tttattgtgc tttgtatat 700
atactcatcc atagtggctt ataattcttc aactctccac agaaactcca taggtctctc ttagcctcat 770
tgtttcaaga aaatggtaga tct 793

<210> 6
<211> 984
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> cinnamate 4-hydroxylase (C4H) promoter
<400> 6

tgatatgaga aactaacgtt gcttgaattc aagatagaaa ttgaccttgc aagaagacaa acgtattctt 70
ggaacacgt attaataaat acaaagtagt ttgtcacact acgggagaaa atatctaata aaagtaagac 140
cttatagttt caggaggtta ggttgatatt taaagagaga tttcttttat taacttttta tatatgttga 210
aatcttgaaa ttaatattaa aaagatttgt taatcctttt ctcttgaata ctttggttg atgtgaggga 280
ttcacattta aactattctt aaatgaatct tgaagctgta tgtttgatat tgtgttttta aaatgtattt 350
atctttaaaa aatatcaaat taatgatatt ttaatgtttt ttaaagattt gaaagtatta atttaaaaaa 420
taaaataaaa ttattttaat atatttttaa ataaaaata tttttgaaga gcagactgca ccctatactt 490
gatctcaatt ttaaagagat ttggagaaca caagaattaa aaaagaaaag gataggaaaa aaaaactttc 560
ttgtttgata gccttattac ttgaagctga aatcatcata gattagtggc gccacatta catcttgat 630
agaaatatag aaaggcctgg caaattaatt aatatgatga ccatatgaca ttttcggcca ccaaccgccc 700
ttacctacta ctatccatga tcatcaatgt cactctccta ccacctcaa tgtaacgccc ttaactcccc 770
cccccccaca cacacacaca accctagcta gtagccacac gtcaccacac ctaacgtgtg aaattcaact 840
tcatttcttc tctaattttt gtagcttata aaaccaagc tctctcgtc ctgttgctcc catccaacaa 910
ccatcactct tcttacctca aaaatcccca cctctttctg acaaagaaac cagttccaat attatggtag 980
atct 984

<210> 7
<211> 1007
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> cinnamoyl CoA reductase (CCR) promoter
<400> 7

tgcgctcggg ttgtcccat agtttcattt cttaatttat taagttaa ataaagatacaa taagttggtc 70
acgtttttaa gcaaagagaa acaggaaatg ggtaaaaagc aacataaatt ctctttcaca ttttttgtc 140
accaggttct ttgttggtct aggagtatta attaattaat gctttgacat tgatttatc gtaattctt 210
ttaaactact gaattaaatc caatccacac acaaaatgaa atgggggtag gtgatgtggg tgattatttt 280
ttattcgtt tgatttttat taaaaaaat aaccaactg aattattata tttttaaaaa aactaaaacc 350
ggttcaaacc ggtcggtttc aattcggttt ttaggacaa caaccggttc aaaccacttt ggctcggttt 420
aggtttgatt cggttcgatt tttttgattt taggtttata aaacggaaat tgaactgaac cggttaattt 490
tttaaaaatt ttaaatttaa ttttttaatt attttcttt taattttttg attttatcag tttttcaaat 560
ttttttttca cttaagagag gccatggtca tcatgtacct tcaaagaaga gagagaaata gcaaagcaca 630
tggtgacgtt gtgttgacga ttcacattac aaagacccat actcctactt cacaacactt aataataata 700
ataataataa taataataat aatagtaata agagaaaaaa ctagaaaaac aaaaacaaag agagaagaat 770
ctctttcttc tctctcagag gcgaatattt accagtagta ggtgaggatg gtaacttcta acctataaaa 840
tacatccact ccaccatgtc tttccttgta acatccactt ttcaagccaa gataagaaga aaagacatct 910

cctctcctct tctctctgt ctgttctcca ctttccagc caccaaactc gtatacatat aattacattt 980
atctaaatat aacaacatgg tagatct 1007

<210> 8
<211> 2081
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> ferulate-5-hydroxylase (F5H) promoter
<400> 8

ttcagtgaac atgctgccac aatgacatat atatcatcac aaattaatta atgtctactt taatgctgat 70
atatcttttg tttattattt ttttccctat catgggaaat gagatcaact ttttcagatg aaaattacta 140
attaaactat catatttcca gttaatacaa agatatggaa tctttatttc actaaagata ttattattca 210
taagaatttg atgagttctt gcattatttg ttagattatc ttcacctctc tgcaattagt gcttcatgga 280
ctcctttttt tcttgtgaaa gtagtttgcc atttaaatat agaaatatct catgctttac aaaatataat 350
aatctccccct aagatataat aaattgaact gagatgcaat taagtcgggt aaaaggcctg gatactgcca 420
gtgaataaga ttacacaaa atattggatt ttttcccgct ctgaaagcta attattgtca gaaaaatacg 490
ttttgaaata gttgattttt attgatattg tggaataaaa acatcaatgg ttccaatgta taaccacgaa 560
aatgacttgt aaaaattata ataaggtcta tttttttcat caagcaataa taataagggt aggcacataa 630
atctctcact ttttgcttct gatcaaagat cactaagcag aacttgcatg gaacctcatc tctctctctc 700
tccccctctc tctctctccc cctctccctc tctatatata tatatatata tatatatata tatgcaagta 770
ttagtccatc tgcatgagta cgtggcagtt ttggatatgc tttgataacg gataacaccg agagtacaaa 840
acaaaatctg gtaggttagc tggctcaatt gcaacaaaat aataataaga aatttttagct gcaagcaatt 910
aagaaaatga aagattgcac ctatgtcaac cactgggtta atatttatga tcttaattct tttttttgt 980
ataatttctt ttatatgccg tgaatgaag tcagccctta agttttacat aaatgtttag gttaattaga 1050
aaggagttaa ttctatatat aataagttgt tgattgaaac aaaatatggt ctgtcactct atttttgggt 1120
tgctttttat tgcatagtac ttctgcccta ttgattcagt gaacctttc gtatttataa tataataaag 1190
tagaccttga ataaatattg acatgtaact taaaacatta attgtcctcg ttttgacaac ataaaatctg 1260
tatcaacgta cgtgctcttg tttagggttt tcttttagaca actttatatc tagaaaacgt aattcaatca 1330
aaaaagatat atatatatat atatatatat atatatatat atatatatat atatatagac agacgacata 1400
acaaaaatgt tcgggtcaga actctggact actgatcgaa gttgtttcaa atatattgaa tgggtatatct 1470
taccatagta attaaactgag ttatttcaag atattacaca gacataacat attttgttct tgatcaaaat 1540
atattttatt taaaaatata taaaataat atatttttta tttttaaaaa tatattttta atatcaatac 1610
attaaaataa tttaaaatat aaaaatacaa aaatattttt taaccacaaa aaaaaaaac tatgaaaatt 1680
aatgttctta aatattgttc tccatccaga ttttggtacg tatgcgttcc cagtgtgtac ttgtttatga 1750
aagtctactc ttatttttca acttttctca agacattgaa ttagtaaac aatgttttac gaattggata 1820
cgaaaccttc caaaataata tatatatata tatatatata tatatatata tatatatata tatatatata 1890
tatatatata tatatatata aagagggagg gagggggtgg gggaggtcac aaaaaacctg tatataaagc 1960
cccgtaatat ctttctcagc tttagcaacat ctgaaagttg caattaatca gtggtgtgta ctgtgatgca 2030
cacaatacaa tacataccat agacacaaac acaaaaatct gcatccatgg a 2081

<210> 9
<211> 995
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> sinapyl alcohol dehydrogenase (SAD) promoter
<400> 9

taatcgaaac cgatcgattt gaactggttt cttttttttt ttaatttttg tttggttgct tttttttgtc 70
accctaata attatatata ataataataa taaaattatt taccattatt tgtctgagat tttttttaat 140
agaatgatta aaatgatatt gtaaaaaaaa cctaataata ccatactttt caaataatat tttttactat 210
tattagtgat tgggttgctg tcaaagttgt tttttttttt ttactattc ttaggagttt gtttctttta 280

```

ccctagtcta caggagtttg ttagttacta tcatttcttt aaaaaggaaa ctcatatgga aaaggaaaaa 350
ttgattaaat acaaaaaatt ataaaattac atagagtttt tatttatttg aacgattgag ttttaatttta 420
acttaataaa atataattaa ttacaggtaa aacaagtact tatcaatcat tataagtata ttataaaaca 490
tattaattat gagttcagca aagatttttg ctgatttctt gtctcttcta aactacatgt gacaagatag 560
aaaaaacatc taaatgctaa tgattcttta atatatgact atgcaagtca tttatcttat ttaaatacat 630
taattttaat caaacttaat tttaaattat tggattctaa tataatttg ttttaaaaca cttaggtagc 700
ttccttggtg gacccgaaac tggttcatga actgaaataa tctatgcgaa taacgttttc ccacaaaaag 770
aagaacgact tgctttttta gcgacaatca tgcctccttc gacctcaccg atgacaccac ctgtgagtgc 840
tgtttgccag taacatcacc tccttgctcc tatgtgtata tagaaagaca aacttgccaa gcataaaaaa 910
gaagaagaag aagtcatact atatatcttc tgccttcctt ctcgacgata tttctctatc tgaagcaagc 980
accatggtag atcta 995

```

```

<210> 10
<211> 1269
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> UDP-D-glucuronate carboxy-lyase (UDP) promoter
<400> 10

```

```

ggaaatgtca acacttggtg gaccacacgc acactgtaga cgctaccta cctggccaga ccccgctgcc 70
cagggtattac aatttaattt gaatttgata atatcatctc aactaacttg aatgaatatt ctttttttaa 140
cagttgtatt gcttcatgga aaataaatat tgtatatatt aggatattta atttgaaata aatattatca 210
aatatgactc aaaaccagtg ctaatatatt tatattttga atatgataca atataaacct ttttagtatt 280
aacataatgc atgtgttgaa taaatatttt tttttattaa ataataaata tggattgaat gtcgaaaaga 350
gaaataaata gtgtactcat agttaccca tgtacaagtt gagtacaaca acagatgtag tcaaaataaa 420
agaaaactcg gtctgacgtg tcgttaccat tactgtcatt ggacagtaaa gtctttcgat tgtaacagaa 490
catgttctcc ttctctctgg ccagtaacga ccgcaatta cgcttcctcg aaatttcaat ctaaccttga 560
acactatata agtatatgcc ctgtctctca tcatccgctg tccttaaatc ccttcaaat actacaaca 630
aatatttttt tccctcaatt tatctcagca gcaaaagtct acgtggtaat taaatctcaa tttccattcg 700
tttttatagg gatttttggg tgtctggaga aaaaaataat ggtcatggga ttgagagatt ttgagattca 770
gatctgaagt ttgtttttaa ttttttcaat aactggtggg gtatggtttt tcgttgattt gaagcattgt 840
acatttcgtg tttttgaagt ctcatttaat ttatgcgtcc ctcttttct ctctcactag ctggtgttgt 910
ttgttggtgt gtttattatc atgattagtt gttaaccatc tattttttta tctaatttgg ttacaatcga 980
gttctttata taaagctgta gtctttgagt ttcattgactc gcagcgaaaa aagtttgaga ttttgactct 1050
attttttcac accactcagg tgaactggat ttattatcat gtttttaatt gaaacttggt ggctggtttg 1120
atttaagggt tttgatttgt gggttattta tgaatgtgag gattatgcaa tgttttgttt ctgggtgtgt 1190
tttacaattt atggtggatt gatttttttt ttttaatttc atgattttca gaaattggac aagaatgtca 1260
gatctgata 1269

```

```

<210> 11
<211> 1025
<212> DNA
<213> Populus sp.
<220>
<221> promoter
<223> lipid transfer protein (LTP) promoter
<400> 11

```

```

gaattcgatt acgatgaaat gaagaactga tagcataatc aatcagaaga ttgataatta ttcaaaataa 70
tttttcgaac aatattcaat gcatgatgat tatatgtcgg atcaataaat aatcaattta atgtaaaaaa 140
ggggtactta agtaataaat aataataata ataatgaatg ccttagcatc taaaattcgc tatttttaga 210
agaatcacat tccaagcttc atgaacaatc taatgttcaa tgacatttga tatttttaat aattcaagaa 280
tctcaacaat acaagaatca ttggcatcgc aagatatctt ccctaagcaa gctctaaaat ccccgtaaca 350
aacatccttt aaggtatata tattagtctg aaaataatta tgtgttaatc ttcattgtgca gtggtgagta 420
tttcggccat tcaggcgggt gacccgggat cgttcccccag caacggcgctc agtttttaatt tttatgtttt 490

```

cttgaaagtt ttcttaattc ttggcgctgg ctttttgggt ggaaggaacg cgggtgtgcy aaaggtaatg 560
 gccactaatt gggcaagata atggcatgtc tgtgttgcyg tagttggctc aaaggggagc tttgtggtg 630
 tggtaatatt ggagttctag tcttctagag acccactgag atggctggat aatgagcttc aagggttaat 700
 tttgcgctgt cattaaaatg gtaacatctg gatatatgca atggaatggg atgatatggc acccaaatca 770
 ccaacctttg attggactgg aaagaactat aatttacaac actaattttc taaagccaag tgctgcaata 840
 atatcaactt gtctcttgtt gtagtgctag ccccattttg attagtggac tgggcatcga gttgaggttc 910
 atcttgagcgt ataaaagctg tccataggag taggagcatt gcattcccat acagcaagaa aatcaatttg 980
 ttcatatata tagttgagat acagaaatat ggaggctcca gatct 1025

<210> 12

<211> 2341

<212> DNA

<213> Populus sp.

<220>

<221> promoter

<223> ag-13 (AG13) promoter

<400> 12

gaattcgcat ccatgcggtg agttcgcatt ggtttgatcc aagtggaaca tttccatacc cacaccccca 70
 ttagcataac aatcctttat taaaccacta gctagacatg caagattcaa cctacacaca agaaccact 140
 agatagactt cactggaac catgcagcat tctcccgta tgacctcatt actcagctctt ttctactggg 210
 gtttctgttt caaccttctc ctctgtttca acaggcttct gttcttctctt ttcttctctt tcttttggg 280
 cttcgactgc aacctccgct tcttctgccc gtgcctcacc aggccctgta gtctctttag cctcctcgac 350
 aacaggctct acgggtatat ccggctcctc ttttgtctcc tcaacaaccg gctctggtgt ttccttaggt 420
 gtctcctcct cagttttctc tagtaccgtt ggctcttctg cagcgatctt ggtctcttcg agcacttctt 490
 tagtttcagc ttcagctggg gcctcgggct ctgggtgccac gggctcctca gatgctgcaa ctttctctgc 560
 ttcttttggc tcttcatgag ttactgcctc tgggtgctga gtgaccgctt cttctgtggt ggtctcaacc 630
 ttgattggtt gttcattttt ttctcttaca agtgcatctt gcgctgacac aacctgcagg atacgttatt 700
 aaaagaaaag aatgttcacc aaaatgctga tgaggcttta ccatttgta tatatataga gatgaatata 770
 cgaattttca aatatgaaca tccacgaatt aaagatcata attaagatgg aggtgttgat cttgatgtac 840
 attccatcag cataaaactt atcagagtta tatatataaa tatatttaat gacttggag aagtaataga 910
 tgaaatctgt taaataaact tctcaagagg gagattaaat cattcttagt gaatgagta cctcaacagt 980
 ggccattgga actagaagga aaataaagca cagctgggat gcaaaagaaa actgtaagaa gcaaaaagg 1050
 acgttgaggt aattatcaca gaagaggatg aagaaattgc tttgagtatt tgatgcagag tactgatgaa 1120
 cgagggtgga tttatataga gatgtagggg gctcactcga gcgaggagg gagtgagtga gagaagagag 1190
 ctaccgtccg aggaatcttg ggatctgaca ccatagctga tgtcattaaa gaattgttg aagtgaattc 1260
 ctttttagaa tttttttat ttataaatat attataataa tttttttat tttttaaata ttattttgat 1330
 atatgtatat taaaaagaat aaaaataaaa attaaatatt aacaaatctc catttgggca cacgatttaa 1400
 tttgaaaagg ctaaaataat ggaggccatt ttcattcttag ccatcatctt cttttggtcg cgtgtgctga 1470
 tgtgctttgt gcagtcggtc atgtaggatg ttatcatcca ttcattgtct caacttgcca ttcgtcatta 1540
 acaactctc cttttttttt cttttttttt taaggataaa tgaattaat ttttaagaaa ataataaaaa 1610
 taatttgcata aaatttttag aaataaaaaa ttccaacaat gctgggtcac taaaattatt aataatattt 1680
 aagaaataaa agcaattgac caaaagaact ttcaaaaaaa gctatcttta tttttttttt taatatttct 1750
 caatatttgc ttgcactata aactagtact gtgattttct catgttaaata aataataata ataataataa 1820
 tcacccttaa ccaataggca taatttactt caaacaagcg aataaaactc tgacgtggaa atttaagttg 1890
 gtcccacgct ctctctcggc cattgcttta tcaattatgg tatttcataa aaaatttaata tttttttaa 1960
 tagttttaat atattaatat taaaaataat ttttaaaata aaaaatatta ttttaataata tctttaaatt 2030
 aaaactactt taataaaca gctatcacat tatcaaacgc tatttaaagt cgcgcgatcc cacgagatgc 2100
 agggatagca acattagtgt aggactggat cagctgagct ggagctggtg gacggccatg tccacggatt 2170
 tcgtcgctgt cgattacgtg tcaacagttt ttttttatat tattttcttc tacttttcca gatggatcca 2240
 agcctccaag aacgaaacat tggctacagt ttgaaaactc ttaaaaatgt taagattaat aagattagca 2310
 gcatcatatt aagtcaagga atgtcagatc t 2341

<210> 13	
<211> 31	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 13	
gccatagctc cttaagagaa acagaaagca a	31
<210> 14	
<211> 32	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 14	
caatatagaa tcaatgaaca gcactagttt gc	32
<210> 15	
<211> 20	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 15	
tcatgtccta tccaacggcg	20
<210> 16	
<211> 24	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 16	
ctcattttct ctcaaagctc aaag	24
<210> 17	
<211> 30	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 17	
gacaactagt ctaaagttaa aacttagacc	30
<210> 18	
<211> 20	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 18	
ccctggaggt tggggtgagt	20
<210> 19	
<211> 25	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 19	
gcgttcattct acaaaaccct cctcc	25
<210> 20	
<211> 23	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 20	
ttcatcctta tttttttggg ata	23

<210> 21	
<211> 20	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 21	
caaaggatca tggagttgga	20
<210> 22	
<211> 34	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 22	
tatactaata tgacctaata acttagaagt gtgg	34
<210> 23	
<211> 22	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 23	
catcttgatc aagattgaat tc	
22	
<210> 24	
<211> 20	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 24	
cataatatca aaacttaagc	20
<210> 25	
<211> 33	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 25	
tgaattgatg acgtaggaaa catgataaac atg	33
<210> 26	
<211> 28	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 26	
cattttcttg aaacaatgag gctaagag	28
<210> 27	
<211> 29	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 27	
gacatgagaa actaacgttg cttgaattc	29
<210> 28	
<211> 33	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 28	
cataatattg gaactggttt cttgtcaga aag	33
<210> 29	

<211> 25
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 29
 gcgctcgggt tgcaccata gtttc 25

<210> 30
 <211> 26
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 30
 catggttgta tatttagata aatgta 26

<210> 31
 <211> 29
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 31
 ttcacgaagc aataataata aggtgaggc 29

<210> 32
 <211> 26
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 32
 catggatgca gatttttgtg tttgtg 26

<210> 33
 <211> 26
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> primer/oligonucleotide
 <400> 33
 ttcagtgaac atgctgccac aatgac 26

<210> 34
 <211> 26
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 34
 aatcgaaacc gatcgatttg aactgg 26

<210> 35
 <211> 21
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 35
 catggtgctt gcttcagata g 21

<210> 36
 <211> 28
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> synthetic primer/oligonucleotide
 <400> 36
 ggaaatgtca acacttggtg gaccacac 28

<210> 37

<211> 23	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 37	
gacattcttg tccaatttct gaa	23
<210> 38	
<211> 24	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 38	
ggagcctcca tatttctgta tctc	24
<210> 39	
<211> 28	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 39	
caagacgatg aaatgaagaa ctgatagc	28
<210> 40	
<211> 26	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 40	
gacattcctt gacttaatat gatgct	26
<210> 41	
<211> 26	
<212> DNA	
<213> Artificial sequence	
<220>	
<223> synthetic primer/oligonucleotide	
<400> 41	
gaattcgcat ccatgcggtg agttcg	26